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# THE SOVIET NAVAL AIR FORCES

Floyd D. Kennedy, Jr.

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# THE SOVIET NAVAL AIR FORCES

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## ABSTRACT

This research memorandum reviews the evolution of the missions and capabilities of Soviet aviation assigned to maritime roles from the days of the Tsarist Navy to the present. The author addresses the mission priorities revealed in the Soviet literature, the hardware developed in response to those priorities, and the trends that can be identified from the literature and these developments.

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# INTRODUCTION*

The Soviet Navy (*Voyenno-Morskoy Flot*—VMF) today is an integrated system composed of many elements that collectively contribute to its assigned missions. Three main combat arms make up the offensive and defensive power of the VMF: submarines, surface ships, and aviation. Units of each are used together in a way that permits each element's strengths to make up for the weaknesses of the others.

Perhaps the least examined combat arm of the VMF is aviation. Today the aircraft directly subordinated to elements of the Navy, that is, belonging to *Aviatsiya Voyenno-Morskogo Flota* (AVMF) or naval aviation, number over 1,600. In addition, the other air services—*Voyenno-vozdushnyye sily* (VVS) or the air forces, and *Voyska Protivovozdushnoy oborony* (PVO) or air defense forces—have maritime responsibilities to which they can devote additional thousands of aircraft that either cooperate with AVMF or operate independently. These aircraft serve in three generic roles: antisurface warfare, antisubmarine warfare, and air defense. The importance the Soviets place on these roles fluctuates, depending on the perceived threat, the missions assigned to the Soviet Navy, and technological advances, among other considerations. The amount of resources dedicated to developing and producing hardware for each of those roles changes accordingly. Only today, after almost 70 years of existence, do the AVMF and cooperating air services appear to be achieving a balance among the three roles while extending their reach farther from the Soviet homeland into the ocean expanses.

The capabilities of those services that make up the Soviet naval air forces are improving dramatically. To understand the nature of these improvements and their effect on the Western naval powers' ability to accomplish their own missions, it is necessary to look at the evolution over the years of AVMF and the maritime roles of the other air services.

*The author is indebted to Ms. Susan Clark, Mr. Charles Petersen, and Mr. James McConnell for their invaluable assistance in translating passages from, and patiently explaining the nuances of, the Russian language.

## EARLY HISTORY

The early World War I Imperial Russian Navy had no organized aviation units, but instead made operational use of air assets belonging to the navy's observation and communication service. By 1916 the Russian Navy had established its own independent aviation units directly subordinated to the fleet commanders, and hydroplanes (the generic term for both floatplanes and seaplanes) began routine operations in support of the fleet. Crane-equipped aircraft transport ships carried from six to ten hydroplanes, and would winch the aircraft onto the water for flight operations and back onto the deck when flight operations were complete. The first Russian seaborne aircraft strike at an enemy land target occurred 6 February 1916, when ten hydroplanes struck the Turkish port of Zonguldak with 38 aerial bombs totaling some 800 pounds. Soviet accounts claim one steamship and several small craft were sunk.[1]

Shortly after the October Revolution that brought the Bolsheviks to power, Lenin ordered the formation of the Workers' and Peasants' Red Navy and with it the first units of Soviet naval aviation. On 27 April 1918 the Baltic Special Air Brigade was established with one fighter and two hydroplane divisions, 48 aircraft altogether. Subsequently, additional air detachments were formed for operating from lakes, rivers, and the Caspian Sea against the counterrevolutionary White Russian armies. The first Black Sea naval aviation units were formed in 1920.

Soon after the establishment of these Black Sea units, all Soviet naval aviation was absorbed by the Workers' and Peasants' Red Army Air Force, and remained so subordinated until 1938. During the Air Force stewardship, naval aviation units retained their identity and were dedicated to fleet support, just as other Air Force units were linked to the ground forces in their respective military districts. When the Pacific and Northern Fleets were formed in 1932 and 1933, respectively, Air Force units were created for their support. Equipment was modernized, although the backbone of the air units remained hydroplanes for reconnaissance and bombardment duties, while fighter units and some bomber units used aircraft identical to those employed by the ground-oriented air units.

By 1935 the organizational complexity of naval aviation's total subordination to the Air Force became too much for the fleets to bear, and a compromise dual subordination was originated. On 1 January 1938, with the creation of the Peoples' Commissariat for the Navy, *Voyenno-vozdushnoy sily*

*Voyenno-Morskogo Flota* (Air Forces of the Navy) was formally established under total naval control, and naval aviation remains in the same relative organizational position today. At the same time, the Soviet high command also assigned a major independent maritime role to the heavy bombers of what would in 1946 become *Dal'naya aviatsiya*, or Long-Range Aviation (LRA).

The Soviet author of the 1935 book *Naval Air Forces* described the missions then assigned to AVMF:

- Participate in military operations against the naval forces of the enemy, jointly with all types of naval forces, with warships of the fleet, or with the fleet and coastal defense.

- Conduct independent military operations against the ships of the enemy in the open sea and at their bases, and against industrial and political centers located on the enemy's coast. Neutralize his air forces, battling him in the air and destroying his aerodromes.

- Provide the fleet, coastal defense, and military aviation units with air reconnaissance, patrols, and cover.

- Execute support missions to service naval forces (communications with distant areas along the coast, airlift of supplies, etc.).[2]

World War II found Soviet naval aviation engaged first in the Winter War (1939 through 1940) against Finland, then in the Great Patriotic War (1941 through 1945) against Germany and its allies, including Finland. Naval flight operations were oriented primarily to act against Finnish shore targets and ports in the Winter War, and almost totally to support continental missions during the early stages of the Great Patriotic War. In fact, Baltic Fleet medium bombers, under General Headquarters command, conducted the first Soviet air strike on Berlin on 8 August 1941 and bombed that city several times before their bases were overrun by advancing German troops in September. In general, the ferocity of the initial German assault forced almost all of naval aviation into direct support of Frontal troop operations through 1941 and well into 1942.

By the beginning of 1943 AVMF comprised over 700 aircraft, most of which were fighters. The Red Army had just gone over to the strategic offensive at Stalingrad, and naval aviation units were supporting ground

force coastal operations. At this time some units also initiated actions against German sea lines of communication, particularly in the Barents and Baltic Seas. Black Sea Fleet aviation units focused on striking ports and bases, coordinating such actions with the operations of ground and their dedicated air forces. As evidenced by the large proportion of fighters in the makeup of AVMF (382 out of 723 total aircraft in November 1942), air defense of naval facilities and military forces was the single largest role played by the fleet's aviation.

The overwhelming continental character of the war dictated the almost complete dedication of naval aviation units to the support of ground forces. Through 1944 AVMF flew only a small percentage of its sorties in a distinctly maritime role, and the other air forces, most notably Frontal Aviation and Long-Range Aviation, flew virtually no maritime sorties, despite the latter's charter to conduct independent maritime operations. *Vzaimodeystviye*, the formal operational principle of cooperation, was a distinctly one-way street, with naval aviation performing the missions of ground force-dedicated air force units and not vice versa. Although in 1944 more sorties were dedicated to naval missions than ever before, particularly by aircraft of the Northern and Black Sea Fleets, the aviation units of the Baltic Fleet flew most of their sorties in direct support of the Red Army advance into Germany. Even the maritime missions were closely linked with the Red Army advance since most were attacks on German gunfire-support ships and troop convoys in the Baltic.

As Germany's Eastern Front succumbed to the massive firepower and grand envelopment operations of the Red Army, the need for AVMF as a supplement to Frontal Aviation forces declined dramatically. At the beginning of 1945, AVMF aircraft from all the European fleets began flying most of their sorties on distinctly maritime missions and were no longer tied to the immediate tactical needs of the Red Army commanders. During this last period of the war, AVMF accounted for the majority of enemy shipping sunk, far surpassing the combined total from submarine and surface actions. Sources vary on total numbers of enemy ships sunk by AVMF during the Great Patriotic War and the 3-week war with Japan. The two primary sources consulted for this history, *Wings Over the Sea: History of the Creation, Deployment and Combat Activities of USSR Naval Aviation*, and Lieutenant General A.M. Shuginin's three-part series on AVMF's history, "Naval Aviation's Combat Road," published in the August, September, and December 1966 issues of *Morskoy Sbornik*, cite total ships sunk as 792 and 1,015, respectively. Because the authoritative *Soviet Military Encyclopedia* quotes the former

figure and cites *Wings Over the Sea* as a reference, 792 is likely the officially recognized, but probably exaggerated, tally.

Altogether, AVMF flew 357,238 operational sorties during the war. A mission-by-mission breakdown suggests some priorities: 110,939 sorties were flown in air defense of land bases or forces; 82,879 directly supported ground troops; 50,892 air reconnaissance sorties were flown; 37,683 were flown as air cover for Soviet and/or allied ships at sea; 35,175 were actions against naval bases and ships at sea; 6,777 were flown against enemy airfields; and 32,893 are explained in *Wings Over the Sea* as "other tasks." Obvious from this tally are the heavy continental orientation and limited attention paid to maritime roles during the war as a whole. Not readily apparent, but nevertheless important to the AVMF's postwar orientation, are the facts that air antisubmarine warfare (ASW) was of such secondary importance that it was lumped into the "other tasks" category, and that the majority of sorties flown in the enumerated naval roles occurred in 1944 and 1945. These circumstances created a momentum within AVMF for the accelerated adaptation of ground force-oriented operational art, tactics, and weapons to naval applications not only in the late war years, but also in the immediate postwar years.

## POSTWAR SOVIET MARITIME AVIATION

With the defeat of Hitler's Germany, the most powerful potential enemy the Soviets might have to face was the maritime coalition headed by the United States. At the end of the war, the United States fleet had in its inventory 99 active aircraft carriers of all types[3] and thousands of amphibious assault ships and craft.

The Soviet air forces applied their late war experience against the Germans and their newly acquired German aeronautical engineers to the problem of homeland defense against such a maritime enemy, resulting in an AVMF that by 1950 had begun to receive the latest jet fighters for air defense and twin-jet bombers primarily for torpedo attacks and secondarily for bomb attacks on surface ships. Although the aircraft were not developed for a peculiarly naval role, at the time there were no peculiarly AVMF missions other than torpedo bombing. For that role, AVMF adopted the losing Tupolev entrant in the competition for a *Voyenno-vozdushnyye sily* (VVS or air forces) twin-jet light bomber, the Tu-14 Bosun, ordering some 500. At the same time the Navy also accepted variants of the winning VVS design, the shorter-ranged Ilyushin Il-28 Beagle. Ultimately, the Beagle outnumbered the Bosun in the AVMF inventory by a considerable margin because production of the latter was terminated after 100 units, arguably to make room for production of the new Tupolev design for the VVS, the Tu-16 Badger.[4] If this was the reason, it illustrates the dominant influence exerted by the Ground Forces and their continental strategy even against a maritime enemy.

In February 1951 the U.S. Sixth Fleet in the Mediterranean Sea received its first attack aircraft capable of delivering the huge atomic weapons of the time,[5] effectively complicating the mission of the Soviet service dedicated to the air defense of the homeland, *Protivovozdushnaya oborona* (PVO) *strany*. The Soviet Navy's own ability to counter these carriers was limited primarily to its submarine fleet if the carriers did not close to within a few hundred miles of the coast, the effective range of most of AVMF's aircraft. By 1955 the lack of organic AVMF assets that could effectively provide long-range air cover for friendly surface ships and strike enemy forces beyond coastal waters had become a subject for discussion in the Soviet literature.[6]

This is not to say that AVMF had not grown in both size and quality since the end of the Second World War. Ending the war with approximately 1,500 aircraft of all types, the air arm of the Soviet Navy by 1955 consisted of

some 2,000 MiG-15 and MiG-17 jet fighters, nearly 1,000 Tu-14 and I1-28 twin-jet torpedo bombers, 250 Tu-4 medium bombers and 240 Tu-4 reconnaissance aircraft,* 60 flying boats for ASW, and 450 liaison, transport, and training aircraft.[7] These 4,000 aircraft, with very few exceptions, were the same as those operated by the ground-oriented air forces and the best that the Soviet Union could produce. But they were not designed for maritime roles, having been adapted to naval missions, and AVMF was yet to receive modern medium- or long-range bombers with which to locate and strike enemy naval groupings beyond coastal waters.

The Soviet Navy of the mid-1950s desperately wanted to correct this deficit in long-range air assets. One article in 1956 went so far as to depict the threat as over 100 operational American aircraft carriers embarking some 5,000 aircraft.[8] In reality, the U.S. Navy had in commission on 1 July 1956 only 26 carriers of all types,[9] capable of carrying approximately 1,630 aircraft.[10] Countering such a perceived, or purported, threat required, according to at least one naval author, the *vzaimodeystviye* or cooperation "of other services of the Armed Forces," most specifically the *Dal'naya aviatsiya* or Long-Range Aviation (LRA) arm of the air forces. Without such cooperation, the author asserted that the Navy would be unable to repulse "enemy strikes from seaward."[11]

This was a particularly devastating admission, but at the time AVMF's formal missions did not specifically include repulsing aircraft carriers at a distance, that is, in oceanic theaters. In 1954, the second edition of the *Great Soviet Encyclopedia* listed AVMF's missions as:

> . . . to struggle for command of the air in a sea theater of military action, especially in the region where fleet operations are being conducted; to protect fleet bases and ships from strikes by enemy aviation; to destroy targets at naval bases and coastal installations and interdict sea lines of communication of the enemy and protect one's own; to support one's own formations of surface ships and submarines in naval engagements; to [conduct] air reconnaissance; to support the ground troops operating on maritime axes.[12]

Evidently, AVMF's primary missions centered on air-to-air operations including PVO (air defense), and the coastal (i.e., sea as opposed to oceanic

*The Tu-4 Bull was a Soviet copy of the Boeing B-29 Superfortress.

theaters of military action) attack missions permitted by its short-range aircraft. This accounts for the large number of fighter aircraft in the navy. But a change in orientation was coming.

## A NEW DIRECTION

The late 1950s saw a major reorganization within the Soviet armed forces as a whole, culminating in the creation of the *Raketnyye voyska strategicheskogo naznacheniya*, or Strategic Rocket Forces (SRF), in December 1959. Part of this overall reorganization was the consolidation of shore-based naval air defense forces into *PVO strany*, effectively removing all fighter and fighter-bomber aircraft from AVMF and halving its size. However, at the time the Navy was giving up its fighters, it was also receiving the Tu-16 Badger medium bomber equipped with the AS-1 Kennel antiship missile (ASM) first and then, from at least 1961, with the AS-2 Kipper ASM. This weapon system extended the reach of AVMF beyond coastal waters and for the first time gave the Soviet Navy an organic, medium-range (a 1,300-n.mi. combat radius with maximum weapons load) bomber that could deliver a nuclear or heavy conventional warhead from outside the shipboard antiaircraft weapon envelopes of most ships. Reconnaissance and tanker variants of the Badger also began entering AVMF service in the late 1950s, vastly improving that service's oceanic reach.[13]

The enhanced capabilities these medium-range aircraft provided AVMF within the context of nuclear war were noted by Marshal V.D. Sokolovskiy in all three editions of his book *Military Strategy*, first published in 1962.

> A paramount task of our navy, from the first minutes of the war, will be to destroy enemy carrier attack forces. . . .
>
> Attack carrier forces, whose mission is to deliver strikes, are meant to be deployed in limited areas, accompanied by large concentrations of surface ships. Attack carriers located in the center of these forces represent the principal, and very vulnerable, target for nuclear strikes with missiles or torpedoes. . . .
>
> Missile-carrying nuclear submarines are an effective weapon for combating aircraft carriers and other surface vessels. . . .
>
> Attack carrier forces can also be successfully combated by long-range naval aircraft. These planes have air-to-ship missiles with nuclear warheads and can deliver strikes without coming within the firing range of a carrier force's antiaircraft defense.[14]

Sokolovskiy's comments implied a role for AVMF beyond the sea (or coastal) theaters previously prescribed for it in official definitions of its missions. This was confirmed by the 1965 Soviet *Dictionary of Basic Military Terms*, which defined *Aviatsiya Voyenno-Morskogo Flota* as: "One of the basic naval arms, intended to wage combat actions at sea *and in the ocean* [emphasis added], independently or in cooperation with submarines. . . .[15]

Ever mindful of the dominance of the ground force perspective in the highest councils of the Soviet Ministry of Defense, the Navy was careful to explain its independent oceanic theater operations as being in direct support of the ground forces. Using this rationale, the Navy could argue for the capability to detect, target, and engage hostile carrier groupings and ballistic missile submarines farther and farther from Soviet shores.[16] The first sign that this approach was successful was the transfer to AVMF in the mid-1960s of several reconfigured reconnaissance and targeting variants of LRA's standard long-range bomber, the Tu-20* Bear. These Bear Ds provided AVMF with a 4,000-n.mi. radius for target detection and tracking in support of both submarine and strike aircraft platforms, but LRA still retained the only strike aircraft (AS-3-equipped Bear Bs and Cs) that could exploit the Bear Ds' targeting data at maximum range.[17] Independent maritime operations were still an element of LRA's charter.

The second sign came on 27 December 1967 when the Soviets launched their first radar-equipped ocean reconnaissance satellite (RORSAT), Cosmos 198, for all-weather detection of shipping. RORSATs and, subsequently, electronic intelligence ocean reconnaissance satellites (EORSATs), are designed to identify formations of ships, their directions and speeds, and to downlink that data within a single orbit for targeting purposes, permitting long-range ASM platforms to fire over the horizon.[18] The combination of Bear Ds and RORSATs/EORSATs greatly extended the oceanic detection capabilities of the Soviet Navy, and provided AVMF with effective targeting data for the efficient employment of its, and LRA's, strike aviation assets.

ASW assumed new importance for the Soviets with the first patrol of USS *George Washington* (SSBN-598), which began on 15 November 1960.[19] Until that time ASW had not even been considered a primary AVMF

*Tu-20 is the Soviet military designation of the aircraft known in the West as the Bear. The Tupolev design bureau designation for the same early model Bears (A through E) is Tu-95.

responsibility, and fewer than 60 obsolescent Be-6 Madge twin-engined seaplanes were the only aviation assets partially dedicated to the role. The U.S. ballistic missile submarine force galvanized the Soviet Navy into developing new airborne means for ASW. A normal, evolutionary replacement for the Be-6, the Be-12 Mail twin-turboprop seaplane, entered service in 1964 with a considerably upgraded sensor suite, but like the Be-6 the aircraft was suitable only for coastal ASW. The first true AVMF responses to Western SSBNs were the land-based I1-38 May and the dedicated ASW helicopter, Ka-25 Hormone, which entered service in 1967 and 1965, respectively.[20] The Hormone's primary platform, the helicopter cruiser *Moskva*, became operational in 1967, and her only sister, *Leningrad*, entered service in 1968.[21] The relatively few Mays that were built (fewer than 100) and the fact that construction of the *Moskva* class was halted at two, suggests that neither platform was effective against American SSBNs, which were constantly increasing the range of their missiles and thus moving farther and farther from Soviet shores. In any case, the Ka-25 Hormone has proved relatively successful in at least a tactical ASW role, almost 460 having been built and detachments having been deployed on every large Soviet ASW ship.

With the apparent failure of the Soviet air and surface navies in detecting and attacking the SSBNs themselves, emphasis within AVMF shifted to attacks against the SSBN's supporting elements. These were identified as bases, command posts and communications centers, navigational systems, and missile transports and other mobile logistical means, all of which could be brought under attack by either air or missile forces.[22] Thus, the anti-SSBN problem was translated for AVMF into the antiships-and-bases problem, which strike elements of that branch already had relatively well in hand.

This is not to say that airborne ASW was dismissed by the Soviet Navy; instead, existing capabilities were redirected to the growing Soviet naval mission of protecting its own force of ballistic missile submarines from enemy "multipurpose" submarines. The physical destruction of enemy SSBNs probably became, for the time being, the exclusive domain of the growing Soviet attack submarine force while AVMF developed the necessary long-range air- and possibly spaceborne platforms and appropriate sensors for future contributions to this role. The effective patrol ranges of the Mays and the Mails provide a useful adjunct to the layered, or echeloned, surface ship and submarine ASW defenses on the approaches to Soviet SSBN operating areas established from 1973 in the Arctic seas.

When AVMF relinquished its organic air defense capabilities to *PVO strany* in the late 1950s, the latter service also assumed all naval PVO responsibilities. The definitive piece outlining these responsibilities was written in 1969 by Maj.Gen. of Aviation I. Lyubimov. They included the protection from air strikes of naval bases and ports, airfields, and other shore targets of the fleets; the protection of ships at sea, during transit and in combat; the engagement and destruction of enemy minelaying aircraft; the escort of AVMF missile-carrying aircraft; and the engagement and destruction of enemy reconnaissance aircraft.[23]

Obviously, the employment of land-based *PVO strany* fighters in all of these roles tied Soviet naval assets to the range limitations of those aircraft, if appropriate fighter-cover were to be provided. For a time in the 1960s, Soviet naval authors argued that such cover was unnecessary, that shipboard surface-to-air missiles could handle the threat. This notion was dispelled by the abysmal effectiveness of Soviet surface-to-air missile systems in Vietnam, giving added significance to Lyubimov's article. Other articles emphasizing the importance of air defense followed, indicating new and additional concerns of the Soviet naval leadership on defending naval forces from air attack.[24]

Thus the redirection of naval aviation's focus in the late 1950s and 1960s was from a coastal defense force to a service with added responsibilities at ever-increasing distances from the Soviet homeland. This redirection was an integral part of the expansion of the overall Soviet naval posture under the dominion of Admiral of the Fleet of the Soviet Union Sergei Gorshkov, who had assumed command of the Navy in 1956. This expansion was designed to extend the homeland defensive perimeter seaward and to secure the seas contiguous to the Soviet landmass for both defensive and offensive (i.e., the patrol of Soviet SSBNs) reasons. If AVMF were to continue to play a role in this expansion, it required new systems with a longer reach, at least matching the capabilities of those LRA aircraft tasked with independent operations in the oceanic theaters.

## THE MODERN AVMF TAKES FORM

By the beginning of the 1970s, three generic applications for AVMF forces had been identified in the recent Soviet literature: antisurface ship strike, antisubmarine warfare including anti-SSBN operations (hereafter described as strategic ASW), and fleet air defense. All suffered at the time from a lack of "oceanic reach" that was needed to compensate for the perceived threat. All three had systems that were being developed to correct their deficiencies (in varying degrees).

The first of these systems to appear was the Bear F* long-range antisubmarine variant of the Tu-20 Bear bomber. These aircraft began rolling off the reopened Tupolev production line in the late 1960s or early 1970s and entered operational service sometime before 1973. Unofficial western sources credit the Bear F with over a 5,000-n.mi. combat radius, but this distance allows for virtually no on-station patrol time. There is little to suggest that the Soviets have resolved the strategic ASW detection problem, but in the Bear F they do have a platform with the necessary range for prosecuting detected SSBNs. At least 60 of these aircraft have been built, and low levels of production may be continuing.[25]

The second major system to appear was the variable-geometry, supersonic Backfire bomber, armed with the Mach 3 AS-4 Kitchen antiship missile. Backfire entered both Long-Range Aviation and naval service at approximately the same time in 1974, and provided both services with a standoff missile platform capable of strike missions up to 3,000 n.mi. in radius (unrefueled) or supersonic low-altitude penetrations of carrier battle group defenses at a shorter radius of action. The importance allotted to this weapon for AVMF missions by the Soviet high command is illustrated by the fact that production deliveries are split about evenly between LRA and AVMF, the first time in the postwar period that the Soviet air forces have shared a new aircraft so equitably with their sister service. The Tu-22M Backfire** has extended the strike reach of AVMF in a manner calculated to exploit the detection ranges provided by Bear Ds and RORSAT/EORSAT systems.[26]

*Tupolev design bureau designation Tu-142.

**Tupolev design bureau designation thought to be Tu-145.

The introduction of the trio of AVMF capability improvements was completed on 18 July 1976 when the "antisubmarine cruiser" *Kiev* transited the Turkish straits from the Black Sea into the Mediterranean with vertical takeoff and landing (VTOL) Yak-38 Forger fighters embarked.[27] Though certainly no match for any modern land- or even other sea-based fighter in air-to-air combat, the Forger could easily intercept maritime patrol aircraft, and represented a significant first step in Soviet development of sea-based, fixed-wing, fighter-type aircraft. The multipurpose function (including air defense) of the *Kiev*-class ships and their embarked air groups was further supported by the reclassification of the ships from PKr (*Protivolodochnyy kreyser* or anti-submarine cruiser) to TAKr (most probably *Tyazhelyy avianesushchiy kreyser* or heavy aircraft-carrying cruiser)[28] in the late 1970s. With the arrival of *Kiev*, and pending the arrival of more capable interceptors and even more capable ships, AVMF could begin developing tactical doctrine for sea-based aviation in, most importantly, fleet air defense, and also antisurface strike.[29]

The late 1970s, like the late 1950s, was a time of reorganization for the Soviet armed forces, particularly the command structures. The naval literature of the time reflected an increased focus on issues of command and control and cooperation (*vzaimodeystviye*) among the branches of service operating in the oceanic theaters. Concluding an exhaustive tutorial on the principles of cooperation as displayed during the Great Patriotic War (1941-45), Fleet Adm. Smirnov related the experiences of that war to "the present day" of 1977:

> The new capabilities of naval weapons and means of communication as well as of the means of maritime surveillance and the collection and processing of information have created new conditions and opportunities for the accomplishment of *vzaimodeystviye* in a tactical, operational, and even strategic plane. In this regard, under certain conditions the problem of *vzaimodeystviye* in a number of cases develops into a problem of centralized control of the actions of mixed forces whose purpose is the accomplishment of a common operational or strategic mission.[30]

The control of forces operating in oceanic theaters was an important issue because the charters for sea and oceanic operations of the air forces were apparently being expanded within the context of this late-1970s reorganization. In fact, 1977 and 1978 articles and encyclopedia entries by several senior air forces officers emphasized their services' missions at sea.[31] Even

Frontal Aviation forces were entering the sea theaters of military actions according to the authoritative *Soviet Military Encyclopedia*:

> Frontal Aviation (FA) is one of the kinds of Aviation of the Air Forces of the Soviet Union and of certain other nations. Its purpose is to fulfill combat tasks in operations (tactical operations) conducted by land forces and the Air Force, and, on coastal axes, by the Navy....
>
> ...On coastal axes, Frontal Aviation, cooperating with Naval Aviation, could strike ships and other enemy targets as well as cover the forces of its fleet from air strikes....[32]

This assertion carried considerably more emphasis on Frontal Aviation's maritime role than the 1965 *Dictionary of Basic Military Terms*.[33]

So by the beginning of the 1980s, AVMF had improved its capabilities to the point that it could detect and strike deeply into the oceanic theaters of military action against enemy surface forces, it could reach the operating areas of patrolling enemy SSBNs, it could assist in the layered defense in depth of Soviet SSBNs, and it had deployed a fledgling interceptor force aboard two, soon to be three, VTOL aircraft and helicopter carriers. Furthermore, the Soviet high command had apparently recognized the necessity of employing additional, nonnaval air assets in the oceanic and sea theaters to cooperate with AVMF, and therefore reemphasized LRA's maritime role and assigned additional maritime responsibilities to Frontal Aviation. The future form of Soviet maritime aviation had therefore been decided in the 1970s; the 1980s would witness the "fleshing out" of that form.

## THE 1980s AND BEYOND

The missions of the modern Soviet Navy, as defined by the 1983 *Military Encyclopedic Dictionary*, are the following:

- Deliver nuclear strikes on enemy land targets, including industrial centers and military installations.
- Destroy hostile fleet forces in ocean and sea theaters and in base.
- Disrupt the enemy's sea lines of communication.
- Protect friendly lines of communication.
- Assist land forces in the conduct of operations in continental theaters.
- Land amphibious assault forces.
- Repulse hostile amphibious landing forces.
- Transport troops and supplies, and perform other, unspecified missions.[34]

According to the same source, *Aviatsiya Voyenno-Morskogo Flota* fulfills its role in these overall missions by destroying enemy naval forces and seagoing means of transport, screening ship groupings at sea, performing aerial reconnaissance in sea and ocean theaters of military actions, and executing other tasks. "The tasks are executed independently and in cooperation (*vo vzaimodeistvii*) with other naval arms as well as with formations (*soyedineniya*) of other branches of the Armed Forces."[35]

AVMF is well-equipped to execute these tasks, as the preceding sections attest. As of early 1985, AVMF boasted over 120 AS-4-equipped Backfire bombers spread through the Baltic, Black Sea, and Pacific Ocean Fleets, some 240 Badger bombers with AS-2, AS-5, or AS-6 antiship missiles divided

among all four fleets, and about 35 Tu-22 Blinder* free-fall bombers for coastal attack and antiship strike. The Navy's Backfire inventory is increasing at the rate of 15 per year, while the number of other strike aircraft are slowly diminishing because of attrition. Latest Backfire deliveries are of the improved Backfire C version.

For antisubmarine warfare, AVMF numbered some 480 fixed- and rotary-wing aircraft, including 60 Tu-142 Bear Fs, 90 Be-12 Mail seaplanes, about 50 Mays, 120 Hormone ship-based helicopters, over 50 of Hormone's replacement, the Ka-27 Helix A, and 105 Mi-14 Haze A shore-based helicopters. Bear Fs, Helix As, and, possibly Haze As continue to enter the AVMF inventory.

Some 75 Su-17 Fitter C fighter-bombers provide close air support to Soviet Naval Infantry and other ground forces in the Baltic and Pacific Ocean Fleets, and over 100 Yak-38 Forgers are currently in the inventory for embarkation on the three operational and one forthcoming TAKrs—Kiev, Minsk, Novorossiysk, and Baku. Reconnaissance and electronic warfare duties are performed by some 45 Bear Ds, 85 Badger Ds, Es, and Fs, small numbers of reconnaissance Tu-22 Blinder Cs, and several over-the-horizon targeting, ship-based Hormone B helicopters. None of these platforms remains in production. In addition, some 75 Badgers serve as tankers, and an additional 400 aircraft are used for transport, training, or in utility roles.[36]

For the 1980s, AVMF appears to be emphasizing the improvement of its weakest capability, oceanic air defense. Soviet "lessons learned" from the 1982 Anglo-Argentine war in the South Atlantic focused heavily on how critical were the sea-based airborne early warning (AEW) and fighter-interceptors to the antiship missile defense (ASMD) of any naval formation. A trio of authors led by Capt. First Rank B. Rodionov, writing in the Soviet naval journal *Morskoy sbornik*, ascribed to the British the following recommendations for effective ASMD. The recommendations did not coincide with the official British white paper on the subject and, in fact, were more pertinent to the Soviet situation:

- Equip naval groups with airborne warning and control (AWACS) aircraft.

*Tupolev design bureau designation Tu-105.

- Create an AEW remotely piloted vehicle or tethered aerostat to perform the AWACS mission.

- Improve active and passive electronic countermeasures (ECM) systems for countering ASMs.

- Equip carrier groups with long-range, highly manueverable interceptors to keep the enemy at great distances from their targets (the British Sea Harrier was effective only in close-in-air battles [sic]).

- Improve the ability of VTOL aircraft to intercept low-flying targets by modifying their air-intercept radars and equipping them with advanced air-to-air missiles (AAMs).

- Develop more effective, long-range, surface-to-air missiles (SAMs).

- Deploy more antiaircraft Gatling guns on ships.

- Improve shipboard damage control capabilities.[37]

In many cases, these recommendations reflected recommendations made before the Falklands/Malvinas conflict in many articles by Rodionov, and the Anglo-Argentine war was offered up as evidence that the recommendations were, indeed, valid. The implied recommendation for a *mixed* VSTOL-CTOL air wing was new, however.[38] Not so surprisingly, advanced air-to-air missiles, which the British *did* have on their Sea Harriers during the war, first appeared on deployed Yak-38 Forgers 6 months after the war, when those aircraft intercepted a U.S. Navy A-7 and an F-14 approaching the TAKr Minsk in the Indian Ocean.[39]

Interestingly, many of the above recommendations coincide with post-1982 improvements in the fleet air defense capabilities of the AVMF or with what the U.S. Navy is projecting for such improvements. In his 1985 Congressional testimony, the Director of Naval Intelligence projected that an improved V/STOL fighter could appear in the Soviet inventory within the next two years. Later in 1985, the new Director of Naval Intelligence stated that the Soviets were developing an AEW variant of a short takeoff and landing (STOL) aircraft which, he suggested, could be embarked on a new aircraft carrier, currently under construction at Nikolayev Shipyard on the Black Sea. This conventional takeoff and landing (CTOL) carrier, long

projected by U.S. intelligence agencies, will become operational about 1990. It has twice the displacement of the *Kiev*-class ships and will embark as many as 60 aircraft.[40]

The CTOL fighter that is projected as part of the new carrier's future air wing (possibly either the Su-27 Flanker or the MiG-29 Fulcrum) ultimately will provide a Soviet carrier group with the long-range, highly maneuverable interceptors recommended in the Rodionov article. The "improved V/STOL" fighter projected by the DNI, which likely will be the first fighter-interceptor embarked on board the new carrier, can provide the close-in air defense recommended. And the AEW STOL aircraft, also embarked on the carrier, can contribute the requisite airborne early warning.[41]

With such a fleet air defense system, closely integrated with the electronic warfare and surface-to-air missile and gun defenses of the carrier grouping, the Soviet surface fleet can break its air defense umbilical to the shore, thereby extending its oceanic reach. Without this new AVMF air defense capability, that umbilical could not be broken, for, as one Soviet author put it in 1981, "... unless ships are provided with reliable air defense, effective use of naval forces is impracticable in general."[42]

Thus, by the beginning of the 1990s, *Aviatsiya Voyenno-Morskogo Flota* should have in place all the necessary capabilities to fulfill most of its responsibilities within the overall Soviet naval warfighting schema. These capabilities are reinforced by the Soviet operational principle of *vzaimodeystviye*, which ensures the integration of elements of other branches of service into naval operations. The most likely candidates for such integration are the forces of *PVO strany's* successor, *Voyska PVO*, and the long-range Bear G and Backfire aircraft that are now assigned to the air armies of the Supreme High Command *(Vozdushnyye armii Verkhovnogo Glavnokomandovaniya*—VAVGK) and can be assigned to the Navy for the execution of particular operations. Unlike earlier missile-carrying versions of the Bear with their nuclear-only, lumbering AS-3 Kangaroo missile, the updated Bear G carries the same missile as the Backfire, the conventional *or* nuclear AS-4, vastly improving that aircraft's effectiveness against naval targets. Bear Hs, newly built aircraft that carry the new Soviet air-launched cruise missile, the AS-15, can assist AVMF in its responsibilities for attacking enemy naval bases and installations. The VAVGK air army to which all these Bears are assigned is responsible not only for intercontinental missions but also for maritime strikes.[43]

The capabilities of the Soviet naval air forces will continue to grow through the remainder of this century as the Soviet Navy strives to reach farther into the world's oceans. The sole remaining technological obstacle to AVMF's complete capability to execute its missions is the problem of detecting enemy ballistic missile submarines. If a breakthrough should occur, AVMF's Bear F will be available as either a platform for the sensor or as a system that can be cued to localize and attack the contact.

The Soviet Navy is equipping itself to move out of its northern bastions, and the Soviet naval air forces are a key element in that move.

## NOTES

1. This history of Soviet maritime aviation through the end of World War II is based on three main sources: Lieutenant General of Aviation A.M. Shuginin's three-part history of AV-MF, "Boyevoy put' morskoy aviatsii" (Naval Aviation's Combat Road), *Morskoy sbornik* (August, September, December 1966); Petr Nikolayevich Ivanov, *Kryl'ya nad morem. Istoriya sozdaniya, razvitiya i boyevoy deyatel'nosti aviatsii Voyenno-morskogo Flota SSSR* (Wings Over the Sea: History of the Creation, Development and Combat Activities of USSR Naval Aviation) (Moskva: Voyenizdat, 1973); and Marshal of Aviation Ivan Ivanovich Borzov, "Aviatsiya Voyenno-Morskogo Flota" (Naval Aviation), *Sovetskaya Voyennaya Entsiklopediya* vol. 1 (Moskva: Voyenizdat, 1976), 55-57. Borzov was Commander of AVMF at the time of his death, 18 months before his encyclopedia entry was signed to press.

2. Aleksandr Vasil'evich Tsirulev, *Naval Air Forces* (Moskva: Voyenizdat, 1935), 3-4, cited in LCdr. Floyd D. Kennedy, Jr., "The Evolution of Soviet Naval Aviation and the Role of the Backfire," *Naval Intelligence Quarterly*, vol. I, no. 4 (May 1979), 1.

3. Norman Polmar, *Aircraft Carriers: A Graphic History of Carrier Aviation and Its Influence on World Events* (Garden City, NY: Doubleday & Company, 1969), 479. In addition to the 99 U.S. carriers, the Royal Navy numbered 57 carriers of all types operational on VJ Day (derived from appendix B, 719-724, 736-738). Both the American and British fleets shrank considerably after that date, having been reduced by the end of 1947 to 20 and 3 operational carriers, respectively, 482, 489. The Soviets still took account of the enormous number of carriers the U.S. retained in mothballs, however.

4. Bill Gunston, *Aircraft of the Soviet Union: The Encyclopedia of Soviet Aircraft Since 1917* (London: Osprey Publishing Limited, 1983), 329-330.

5. Floyd D. Kennedy, Jr., "The Creation of the Cold War Navy, 1953-1962," *In Peace and War: Interpretations of American Naval History, 1775-1984* (Westport, CT: Greenwood Press, 1984), 306.

## NOTES (Continued)

6. Capt. First Rank V. Shavtsov, "O gospodstve na more" (On Command of the Sea), *Voyennaya Mysl'* (July 1955), 3-17, cited in Robert W. Herrick, "Soviet Views on Air Power at Sea," unpublished manuscript.

7. Horst Pleiner, "Die Sowjetischen Marineflieger" (The Soviet Naval Air Force), *Osterreichische Militarische Zeitschrift* (January 1979), 62-63.

8. Engineer Z.P. Zlobin, "Aviatsionnoye vooruzhenniye bol'shikh avianostsev SShA" (The Aviation Armament of the Large Aircraft Carriers of the U.S.), *Sudostroyeniye* (November 1956), 43, cited in Herrick, op. cit.

9. U.S. Navy, "Carrier Force Levels at End FY (Hull Nrs)," Ships Histories Section, Naval History Division, Aircraft Carrier Subject Files, 14 November 1969.

10. Derived from James C. Fahey, *The Ships and Aircraft of the United States Fleet* (Falls Church, VA: Ships and Aircraft, 1958), 4.

11. Yu. Ladinskiy, "O teorii voyenno-morskogo iskusstva" (On the Theory of Naval Art), *Voyennaya Mysl'* (July 1957), 31, cited in Herrick, op. cit.

12. "Morskaya Aviatsiya" (Naval Aviation), *Bol'shaya Sovetskaya Entsiklopediya*, vol. 28 (Moskva: Gosudarstvennoye nauchnoye izdatel'stvo, 1954), 313.

13. See Gunston, op. cit., 330-332; John W.R. Taylor (editor), *Jane's All the World's Aircraft, 1984-85* (London: Jane's Yearbooks, 1984), 241-243; U.S. Navy, Office of the Chief of Naval Operations, *Understanding Soviet Naval Developments*, 4th ed. (Washington: U.S. Government Printing Office, 1981), 42; Norman Polmar, *Guide to the Soviet Navy* (Annapolis: Naval Institute Press, 1983), 22.

14. V.D. Sokolovskiy, (ed.) *Voyennaya strategiya*, 1st ed. (Moskva: Voyenizdat, 1962), 353-355.

15. *Slovar' osnovnykh voyennykh terminov* (Moskva: Voyenizdat, 1965), 9.

## NOTES (Continued)

16. See, for example, Captain First Rank N. V'yunenko, "Naval Support of Ground Forces," *Voyennaya Mysl'* (July 1963), 62-75, translated in FDD Translation no. 956.

17. Gunston, op. cit., 334.

18. Reginald Turnill, *Jane's Spaceflight Directory* (London: Jane's Publishing Company Limited, 1984), 254.

19. Kennedy, *In Peace and War*, op. cit., 309.

20. Gunston, op. cit., 65-69, 121, 135.

21. Jean Labayle Couhat and A.D. Baker III, *Combat Fleets of the World, 1984-85* (Annapolis: Naval Institute Press, 1984), 688-689.

22. LCdr. Floyd D. Kennedy, Jr., "Attacking the Weakest Link: The Anti-Support Role of Soviet Naval Forces," *Naval War College Review* (September-October 1979), 49-50.

23. Major General of Aviation I. Lyubimov, "Coordination of National Air Defense Troops With the Navy," *Voyennaya Mysl'* (March 1969), translated in FPD 0101/69, 35.

24. Charles C. Petersen, "Aircraft Carrier Development in Soviet Naval Theory," *Naval War College Review* (January-February 1984), 6-7; Captain First Rank V. Vasil'yev, "Razvitiye PVO soyedineniy nadvodnykh korabley" (The Development of Anti-Aircraft Defense of Large Formations of Surface Ships), *Morskoy sbornik* (February 1980), 26-31. For a more comprehensive discussion of Soviet writings on fleet air defense see Cdr. Floyd D. Kennedy, Jr., "The Evolution of Soviet Views on Fleet Air Defense," *Naval War College Review* (July-August 1985), 3-15.

25. U.S. Navy, Office of the Chief of Naval Operations, *Understanding Soviet Naval Developments*, 5th ed. (Washington: U.S. Government Printing Office, 1985), 135; Gunston, op. cit., 335-336.

## NOTES (Continued)

26. U.S. Government, Department of Defense, *Soviet Military Power*, 4th ed. (Washington: U.S. Government Printing Office, 1985), p. 101; Taylor, op. cit., 245-247; "Soviets Trying to Give the Backfire New Image," *Defense/Space Daily* (October 10, 1978), 163.

27. Originally identified as the Yak-36MP Forger, "M" ostensibly for *Morskoy* or naval and P for *Perekhvatchik* or interceptor (Gunston, op. cit., 399), the Forger was identified by Secretary of the Navy John Lehman in February 1983 Congressional testimony as the Yak-38. This designation was later confirmed by the Navy's Chief of Information (CHINFO) and has been commonly used by official British (though, strangely, not U.S.) sources since 1984.

28. I am indebted to Charles Petersen for this more probable definition of the acronym TAKr than the commonly ascribed *"Takticheskoy aviatsionnyy kreyser"* [sic] *(Understanding Soviet Naval Developments*, 5th ed., op. cit., 87) or *"Takticheskoye avianosny kreyser"* [sic] (Captain John Moore, RN, *"Jane's Fighting Ships 1985-86,"* London: Jane's Yearbooks, 1985, 534), which would rate the Kievs as tactical cruisers that carry aircraft, a politically, historically and semantically improbable classification.

29. Since the formation of the Soviet Navy in 1918, whether or not to construct aircraft carriers has been central to the naval policy and planning decisions made at the highest levels of the Soviet government. This paper does not attempt to address the intricacies of the policy-making process. For a comprehensive evaluation of the Soviet love-hate relationship with aircraft carriers see Herrick, op. cit.

30. Fleet Admiral N. Smirnov, "Iz opyta vzaimodeystviya rodov sil VMF v khode voyny" (From the Experience of Cooperation of Naval Combat Arms in the Course of the War), *Voyenno-istoricheskiy zhurnal* (July 1977), 18. For earlier discussions of this issue see Smirnov, "Voyenno-morskoy flot SSSR v poslevoyennyye gody" (The Soviet Navy in the Postwar Years), *Voyenno-istoricheskiy zhurnal* (July 1976); Admiral of the Fleet of the Soviet Union S.G. Gorshkov, "The Experience of History and the Situation Today," *Voprosy filosofii* (13 May 1975), translated in *Soviet Press, Selected Translations*, May 1976; and Gorshkov, "Nekotoryye voprosy razvitiya voyenno-morskogo iskusstva" (Certain

Questions Concerning the Development of the Art of Naval Warfare), *Morskoy sbornik* (December 1974).

31. Lieutenant General M. Gareyev, "Ever Guarding the Achievements of October," *Voyenno-istoricheskiy zhurnal* (November 1977), translated in JPRS 70538, 25 January 1978; Chief Marshal of Aviation Pavel S. Kutakhov, "The Winged Guardians of the Achievements of October," *Kommunist Vooruzhennykh Sil* (No. 2, January 1978), translated in JPRS 70923, 7 April 1978; Colonel General of Aviation G.P. Skorikov, "Combat Wings of the Motherland," *Izvestiya* (19 August 1978), translated in JPRS 71866, 14 September 1978; Colonel General of Aviation V.V. Reshetnikov, "Dal'naya aviatsiya," *Sovetskaya Voyennaya Entsiklopediya* vol. 3 (Moskva: Voyenizdat, 1977), 91-92.

32. M.N. Kozhevnikov, "Frontovaya aviatsiya," *Sovetskaya Voyennaya Entsiklopediya* vol. 8 (Moskva: Voyenizdat, 1980), 334, 335.

33. *Slovar' osnovnykh voyennykh terminov*, op. cit., 238.

34. "Voyenno-Morskoy Flot," *Voyennyy Entsiklopedicheskiy Slovar* (Moskva: Voyenizdat, 1983), 142.

35. "Aviatsiya Voyenno-Morskogo Flota," *Voyennyy Entsiklopedicheskiy Slovar*,' ibid., 14-15.

36. *Understanding Soviet Naval Developments*, 5th ed., op. cit., 85, 132-141; *Soviet Military Power*, 4th ed., op. cit., 101-102; U.S. Government, Department of the Navy, statement of Rear Admiral John L. Butts, U.S. Navy, Director of Naval Intelligence, before the Seapower and Force Projection Subcommittee of the Senate Armed Services Committee on the Naval Threat, 26 February 1985, 10; John M. Collins, *U.S.-Soviet Military Balance: Assessments and Statistics, 1980-1985* (Washington: Congressional Research Service, Library of Congress, 1985), CRS-357, CRS-359.

37. B. Rodionov, Ye. Nikitin, and N. Novichkov, "'Radioelektronnaya voina' v Yuzhnoi Atlantike," (The Electronic War in the South Atlantic), *Morskoy sbornik* (January 1983), 85.

## NOTES (Continued)

38. Petersen, op. cit., 9-10.

39. Kennedy, "The Evolution of Soviet Views on Fleet Air Defense," op. cit., 6-13.

40. "Statement of RAdm. John L. Butts, U.S. Navy...", op. cit., 2-3, 10; RAdm. William Studeman, Director of Naval Intelligence, in an address before the CNA Sea Power Forum, 13 November 1985.

41. Ibid.

42. Captain First Rank L. Yaskov, "Ship's Air Defense," *Soviet Military Review* (October 1981), 14.

43. *Soviet Military Power*, op. cit., 33, 82.

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